COGNITION IS COMMUNICATION

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COGNIȚIA ESTE COMUNICARE

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Abstract
Cognition is Communication. On the basis of previous studies on the phylogenic-psychogenetic approach to the pair MIND-LANGUAGE developing the subject's cognitive conceptualizing power with the highly parallel, hierarchical, pattern-discriminating brain this article will concentrate on the evolution of language in its mechanized forms from writing to Artificial Intelligence. With the Internet and AI, the Authority/Other pole of Lacan's subject are minimized. Are social networks the new anti-social anonymous and uncatchable killers of cognition, or the supreme tools of absolute cognition and total freedom of expression?

Résumé
Cognition = Communication. Sur la base d'études antérieures sur la phylogénie et la psychogénétique du couple MENTAL/LANGAGE générant la conceptualisation cognitive avec le cerveau hautement parallèle, hiérarchique, identifiant de formes cet article concentrera son attention sur l'évolution du langage sous ses formes mécanisées de l'écriture à la langue de l'Intelligence Artificielle. Avec l'Internet et l'IA l'Autorité/Autre du sujet lacanien sont minimisés. Les réseaux sociaux sont-ils les nouveaux tueurs de la cognition, antisociaux, anonymes, intractables, ou bien les outils de la cognition absolue et de la liberté d'expression ?

Rezumat
Cogniția este Comunicare.

Keywords: *Communicational situation, mind/language, cognitive procedure, internet, AI*

Mots clés. *Situation communicationnelle, mental/langage, procédure cognitive, Internet, IA*

1. Introduction

What I presented in Chengdu, China (Coulardeau, 2018) and in Québec, Canada (Coulardeau, 2017) is considered acquired. Here I will go beyond the threshold of third articulation languages to examine what happens when Homo Sapiens uses machines, first of all machines that deal with or process written or oral language, with an evolution from simple mechanical tools using machine code to machines using some linguistic code programmed in them in a more or less discursive way, both written or oral, and then to machines able to use language the way humans do, in a cognitive and conceptualizing way with Artificial Intelligence. Two questions can be asked. Can Artificial Intelligence machines conceptualize and then do Artificial Intelligence machines need human language to do so?

This presentation can be summarized in the form of a "radical ternary tensor graph." (Figure 1) The article will develop this representation and explore the potentials and dangers of the

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evolution to come.

2- From tools to machine code

In the classic theory of Marshall McLuhan (McLuhan, 1964), every invention from clothing to building cities, and constructing trains or planes is an extension of the human body and/or one human competence.

Tools/activities that extended human language, mental representations, the desire to communicate beyond the present, developed very early in human phylogeny. Humans have always been communicational animals. The tools are numerous, from animal representations painted in caves and later carved in stone to the non-representative signs painted in the caves or carved in stone that need have a symbolic value we don't know. This need to represent, be it only with words, started a long time before cave painting that is only the first durable form. Homo Sapiens probably started doing such representations on non-durable materials like their own bodies. Painting on rock faces is universal and started about the same time in many distant places (Lewis-Williams,2002, for discussion). This need led to the invention of writing, first attested in durable form in Sumer, but clay tablets and stylus are attested 3,000 years before the official invention of writing around 3,500 BCE.

Writing was socially needed, commercially for Sumerians, and it took at least 3,000 years to reach full development. The geometric non-representative signs along with cave paintings are the backdrop of the invention of writing (Petzinger, 2016). These signs can be dated back to 40,000 or 35,000 years BCE.

Consider too the case of Gobekli Tepe in Turkey (9,500 BCE) and its carved figures on stone pillars, 6,000 years before the fully developed Sumerian writing system. The phylogenetic phase of such inventions is very long.

The history of writing is well-known with various inventions, particularly the printing press developed in Europe by Johannes Gutenberg and Johann Fust.

Another invention, recording sound and voice, changed the whole world in about 50 years. Later the radio permitted the direct broadcasting of such recordings, or of live performances. Associated to recorded moving images it produced the talking cinema that became television.
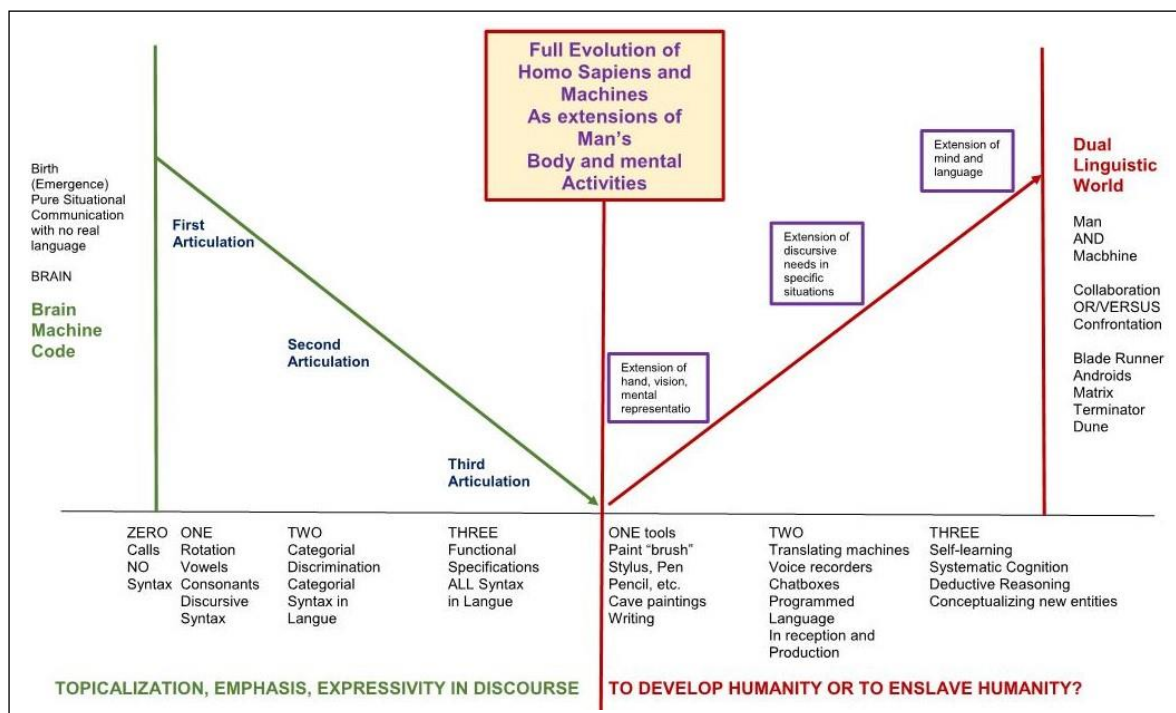
Figure 1: Radical Ternary Tensor from the Brain Machine Code of the animal world to the Dual Linguistic World of tomorrow's Artificial Intelligence

According to Marshall McLuhan writing, printing, and recording have changed the way humanity looks at itself. The impact of each medium was enormous. Before only memory could keep records over time. The Rsi in the Indo-European tradition. The griots of Africa going back to the emergence of humanity itself. Tribal memory chains among American Indians. The mind was liberated from humdrum memorizing: now we "google" the human memory of big data. The human mind can then concentrate on the trail that leads to what we want, and it may open hundreds of unsuspected doors.

McLuhan further analyzes the effects of such inventions on the way man thinks.

> "Only the phonetic alphabet makes such a sharp division in experience, giving to its user an eye for an ear, and freeing him from the tribal trance of resonating word magic and the web of kinship." (McLuhan M., 1964, p. 84)

Then the microphone amplified by radio broadcasting was magic, brought the trance back, but also developed mental communication from one man to others. Writing and literacy made the world shift from "the barbarian or tribal man, . . . hampered by cultural pluralism, uniqueness, and discontinuity" to "Western. . . primary features of homogeneity, uniformity, and continuity." (idem, p. 87) His conclusion is then frightening. "The new literacy had created a homogeneous and malleable milieu in which the mobility of armed groups and of ambitious individuals, equally, was as novel as it was practical." (idem, p. 88) For Marshall McLuhan, the radio was nothing but the new "tribal drum." Speaking of Hitler's radio speech in Munich, March 14, 1936, he wrote:

> "His victims and his critics have been equally somnambulistic. They danced entranced to the tribal drum of radio that extended their central nervous system to create depth involvement for everybody." (idem, p. 298)

Television is the next step in this regressive path back to before writing and printing.

> ". . . the all-involving sensory mandate of the TV image. . . Print asks for the isolated and stripped-down visual faculty, not for the unified sensorium. . . TV is a medium that rejects the sharp personality and favors the presentation of processes rather than of products." (idem, p. 308-309)

McLuhan could not envisage, the mass impact of computers merged with all media into the multifarious Internet. Navigating at will and instantly breaks up the impact of any message. It appeals to all our senses first, then we listen, otherwise, we skip the message. We are all-powerful in that constant zipping and zapping. We can destroy or change what we don't like and produce our own stuff with our personal or stolen materials in the "unfairest" way imaginable.

But that's the surface of things, in no way the analog reproduction of anything. It is mastered by a language we can't see, understand, videlicet machine code, the tool used by the SYSTEM to manipulate us into believing we are the masters of the message though it is only **mediatic massage**. Who is the SYSTEM? An elite that programs these machines. We are only doing what makes us do, getting what they let us get. The most secretive elite, particularly when they play it cool trying to cover up what they have done and permitted others to do with our data. With the Internet, freedom of speech becomes the freedom to manipulate the masses. Unification is this elite's objective, in each nation or at global level. Unification in manipulation by a language we cannot decipher if not part of this narrow elite that speaks and writes code.

This Internet machine code unifies all other media to make us believe we can do what we want freely while manipulating us into piled-up homogenized entities. Populism or street democracy are the direct results of it.

Machine code is the extension of human language in a tremendously restrictive way, extension by reduction: two bits and their piled up combinational bytes of ONEs and ZEROs, originally eight bits, but today unlimited. The extension of our classifying and structuring mind. This two-digit machine code works within a program based on a computational "language": a program of actions and constructed logics with only one objective: to make the machine do something in order for the users to do something else, what the programming elite wants them to do.

Smartphones are developing in the users an OCD taking control of their minds completely. Video game addiction and a video game vision syndrome now identified and can be extended to smartphones. Medical research says video game addiction only concerns 2-3% of users, which is quite phenomenal. Only a member of the programming elite keeps some **free** thought, linguistic expression and human communication.

3- Machine Conversational Code

Voice recognition and synthesis have been a priority for more than 50 years. France Telecoms at Lannion in the 1960s-70s they devised the "diphone" to solve the problem by associating half a phoneme plus half a phoneme including the articulation point between the two, enabling voice synthesis to reach fluent language. Instead of following a phoneme logic, it considered juncture points between phonemes were essential, typical of any particular voice, based on particular personal articulation. Diphone phonology could improve our understanding of oral language and speech.

The concept of "chat"[2] was introduced as instant-messenger based on written communication. Then in oral chatrooms users speak to one another. It is like a telephone. Since the 1940s the Turing test of a machine that can fool a human has been haunting us. Today a chat-bot is navigating its memory and the Internet to find a proper answer to our questions.

I.   MANY OF THESE CHAT-BOTS ARE USED IN LIMITED FIELDS WITH SPECIAL CUSTOMERS IN SPECIAL SITUATIONS, FOR EXAMPLE, THE MEDICAL FIELD WITH WEFIGHT.[3] MOST OF THEIR WORK IS PROGRAMMED AND THE OBJECTIVES ARE CLEAR: TO FOLLOW UP PATIENTS WITH THEIR TREATMENTS, MAKE SURE THEY GET TO THEIR MEDICAL APPOINTMENTS, AND EVENTUALLY DETERMINE IF THE SYMPTOMS GIVEN BY THE PATIENT ARE "NORMAL" OR IF THEY REQUIRE THE INTERVENTION OF A NURSE OR DOCTOR AND THEIR RAISING AN ALERT.

Translating machines are another invention. Google's Translate is a Boolean machine working with big data: trillions of words, sentences, texts, in hundreds of languages, any document, and its various existing translations, looking for words or phrases in their contexts, similar contexts in different languages with similar sememes. Google can select or produce a translation of about anything.

First a classical cultural example. Google translates this line (Racine, *Andromaque,* V 5): "Pour qui sont ces serpents qui sifflent sur nos têtes?" as meaning: "Who are these snakes that whistle on our heads?" There is a major mistake since the identity of the snakes is not concerned but the identity of the targets of these metaphorical snakes. It should have been "Who are these snakes that whistle on our heads **for**," "Whistle" should have been "hiss." The alliteration in /s/ is lost.

In Le Figaro[4], I selected: "Les députés ont adopté ce mercredi le projet de loi sur la réforme ferroviaire par 452 voix pour."

First, Google Translate: "MEPs adopted on Wednesday the bill on railway reform by 452 votes in favor." MEPs, Members of the European Parliament, is an enormous mistake: we are dealing with the French Parliament. It should have been "French MPs" for a European audience and for an American audience "French Representatives"

Second, Reverso: "Members of parliament adopted on Wednesday the bill on the railroad reform by 452 voices for." They missed the normal use of MPs and the reference to France.

Third the translating site "**S**oftware and **D**ocumentation **L**ocalization," a British business. "The members have adopted on Wednesday the draft law on the railway reform by 452 votes in favor." They completely erased the reference to parliament.

The three translating machines use the verb "adopt." The normal word in a parliamentary context is "to pass" and the normal word for a bill that has not been passed yet is "a bill." Either "a

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[2]   Brown Doug and Woolley David R, **Talkomatic**, the world's first multiuser real-time chat system, http://just.thinkofit.com/about/david-r-woolley/,accessed August 9, 2018
[3] https://www.wefight.co/, accessed June 15, 2018
[4]http://www.lefigaro.fr/flash-eco/2018/06/13/97002-20180613FILWWW00288-l-assemblee-nationale-vote-la-reforme-ferroviaire.php, June 13, 2018, accessed June 15, 2018

draft law" is a law concerning conscription (draft), or it is a preparatory document to be discussed in various commissions to prepare a bill then submitted to parliament.

These machines are far from perfection.

With chat-bots and translating machines, we have to consider this linguistic production is no longer machine code but it is **conversational machine code** based on Boolean navigation in its memory or big data corpora.

4- Artificial Intelligence and self-learning cognitive programs

New translating machines using neural networks replace simple two-dimensional multiple connections between words with a full multi-dimensional architectural construct of a whole semantic and/or lexical domain in a three-dimensional visual space only a VR machine can produce virtually. Such a machine can integrate the fourth dimension of time. The vectors between the units in such a network are thousand-directional, varying in length and three-dimensional.

I borrow from Julien d'Huy (d'Huy J., 2013) such a representation (Figure 2). Here presented on a two-dimensional surface, it is three-dimensional. We can rotate it in all directions and use a hologram to have it suspended in midair. It is a Neighbor-Net splitgraph (Bryant D, Moulton V, 2004). As a video representation, it will include the fourth dimension, time, with past evolutions and future hypothetical evolutions. Such a representation was devised for biology and is extended to linguistics. Yet this representation is far from what it should be in linguistics. Every connection between two terms has to be specified in nature, direction, and mode of operation. "Carriage" and "car" are connected. But we need the direction in thought and time, and the nature of the connection. They cannot be separated "cart." We also need their full semantic contents, social dimensions, cultural colorations, and etymology, what Gustave Guillaume calls "signifiés de puissance" and "signifiés d'effet" (English "potential signifieds" and "effective signifieds") all attached or carried by the same signifier(s). We can speak of "a royal carriage" and "a train carriage," but the latter cannot translate "un carosse ferroviaire."

Now an AI machine considers a question with no answer in all its resources it has been programmed with or programmed to find. The machine is not imitating human behavior to fool us. But it can ask its own questions and invent its own answers. We thus could consider it is able to think, self-learn from its experience and conceptualize new notions, procedures, and situations. This is AI, real procedural and conceptualizing intelligence that could develop a new scientific theory to explain a so far unexplained phenomenon.

What language will these advanced AI machines use when they are dressed up in an android body. The outside illusion, the general behavior of these "Blade Runners" will be perfect. They will have some super physical strength, will not feel any pain and they will speak. Will they speak conversational machine code or will they go beyond?
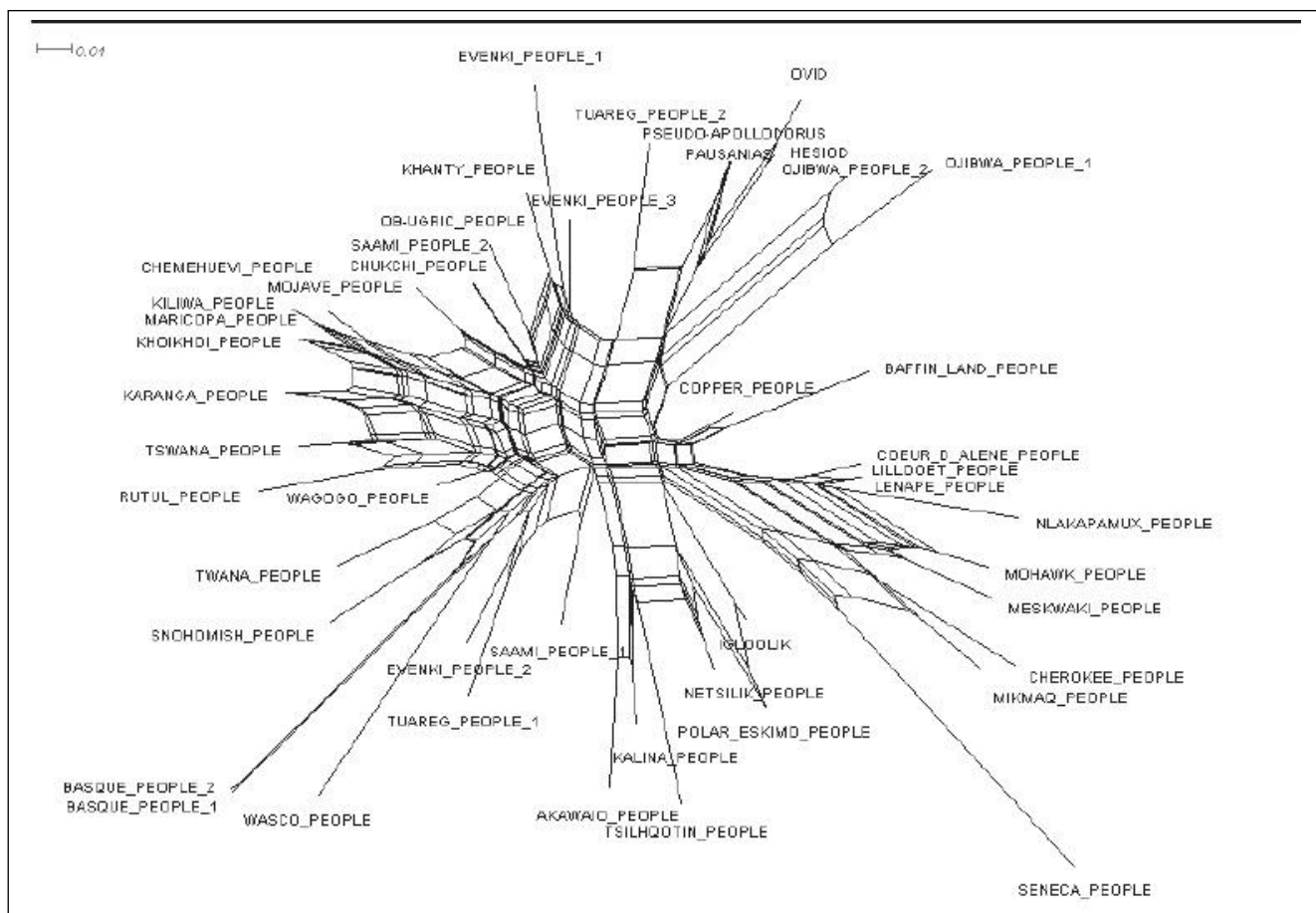
Figure 2: Neighbor-Net Splitgraph without some mythemes
D'Huy, Julien, (2013) "A Cosmic Hunt in the Berber sky: a phylogenetic reconstruction of a Palaeolithic mythology," *Les Cahiers de l'AARS*, # 16, Amis de l'Art Rupestre Saharien, Saint Lizier, France

They will first of all be self-learning. In circumstances not covered by the basic programming and training of the robot, it is able to analyze and cope with this situation. For a car, for instance, it has to overtake a badly parked car and thus cross the solid line in the middle of the road. It must go against the rule it has been programmed with. It must assess on-coming traffic. It must also realize that if it does not overtake, the car(s) behind would try to anyway which would be a lot more dangerous for them. Assessing the on-coming traffic is easy for a computer, but realizing the danger it creates for cars behind, if it does not overtake, is completely different: considering its ethical responsibility in the situation. Has the car been programmed to do this? Maybe but no ethical dimension then? We learn ethics slowly from social experience, and most ethical rules are personal and reflect the individual acquisition process. Can a self-learning robot self-learn the ethical dimension of human life?

A self-learning car, if it speaks, will use conversational machine code like a talking GPS. A full philosophical conversation would be more relevant with a human-looking robot. Dan Brown's latest novel, *Origin* (Brown D., 2017), imagines a robot in a super-server able to predict and manipulate what people would do, and he has all the means to implement his most complicated predictions. This robot has been programmed to destroy itself when some objective is fulfilled, and it does with no way to stop it. But the robot can only have a philosophical or literary discussion because it can access the unlimited Internet, and it can hack what's blocked.

But what comes beyond this simple yet capital ability to self-learn, including ethical considerations?

To conceptualize beyond brain machine code, the machine must step beyond this brain

machine code from its "existential" experience on the basis of its program (cross a solid line to overtake a badly parked car) and then experiment, speculate and conceptualize. But a machine must not experiment. Can a machine speculate alone? Can a machine have a split personality and speculate with itself? Then can we accept machines that speculate with one another, a community of machines next to ours? How would we react if machines were experimenting, speculating and conceptualizing among themselves on their own? If these machines get to a new concept, process or procedure not identified by humans yet, can we enforce the idea we alone can validate the new concept, process or procedure?

Dan Brown's *Inferno* (Brown D., 2013) imagines an insane biologist who devised a new plague to reduce our overpopulation. It is controlled by some mechanical digital mind. A machine can easily conclude the human population has to be reduced by 50%. A bacteriological plague can be an innocuous, invisible, and painless way to reach the goal, and be directed against one particular genetic feature. Beyond ethics, if it is the decision and action of a machine only programmed to examine problems, and look for and implement solutions, one simple programmed rule has to be the machine's conclusion and subsequent action have to be validated by some human authority.

It would be difficult for machines to by-pass this rule, and yet we can imagine machines with that conceptualizing power could become dangerous: paranoia (*2001, A Space Odyssey*, Kubrick S., 1968), or over-logical (*Terminator*, Cameron J., 1984), or an architect's manipulations (*Matrix*, Wachowski Brothers, 1999) as either some totally isolated human commanding the whole mechanical world or the matrix itself controlling all the machines, the "brain" of the mechanical world taking over the whole universe. In our present time, the crazy human being has been marginalized. In numerous films (*Alien* and *Aliens* (Scott R. & Cameron J., 1979-1986), androids are faithful and are ready to die if necessary for the survival of the humans they serve. Yet *Dune* (Lynch D., 1984), the film and the novel (Herbert F., 1965) assume the fundamental idea all intelligent machines have been banned by the Butlerian Jihad.

At this point, we come to the idea that beyond **AI machine code** we reach **AI language**, with the full power of that linguistic code. But what initial natural language should be used? Difficult to use a basket of languages wider than Indo-European languages, because of phylogenetic different characteristics and procedural evolving systems. These machines would have to start from a dominant global language, a language for all. A unique synthetic symbiotic language would speak to no one. The only universal yet expanding everyday language is mathematics, an elite's language that is neither conversational nor literary, poetic, artistic, imaginary, all characteristics human language develops daily.

5. Conclusions

This goes against two authors who share one conclusion: machines will become more intelligent than men and women due to the inescapable Singularity and take over humanity.

The first author is the American Ray Kurzweil (*The Singularity is Near*, Kurzweil R., 2005). He refers to the mathematical concept of "singularity": "In general, a singularity is a point at which an equation, surface, etc., blows up or becomes degenerate. Singularities are often also called singular points."[5] Kurzweil means that by 2050, machines will be more intelligent than men, able to process any information faster than man's brain. Speed is the most important element along with the complexity of operations, too complicated for man' brain. Kurzweil does not envisage any mental development of man using the machines he himself invented. His vision of humanity is static and speechless: no linguistic communication with the machines. Many million nanobots will regulate, regenerate and make every organ or function quasi-eternal in man's body. These nanobots are intelligent with precise missions but Kurzweil does not envisage their source of energy, their lifespan, and what happens when they "die." He does not consider they could communicate among themselves within one body or several bodies, and constantly with some managing board controlled

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[5] WolframMathWorld (1999-ongoing), http://mathworld.wolfram.com/Singularity.html, accessed June 17, 2018

by some unidentified entity? Humanity would be reduced to hybrid human-machines controlled by a mastermind on a managing dispatch board. A dystopia that does not consider humanity should impose ethical norms in the conception, construction, and use of such AI machines.

The second author is the Israeli Yuval Noah Harari (*Sapiens: A Brief History of Humankind* and *Homo Deus*, and *A Brief History of Tomorrow*, Harari Y.N., 2011-2015). Yuval N. Harari goes back to the cognitive revolution 70,000 years ago. This date corresponds to the third migration out of Black Africa and third articulation languages, what he calls "fully-developed language" At that date Homo Sapiens suddenly became cognitive. All migrations out of Black Africa had taken place or were in their final stage and cognition appeared in man then. Harari erases the Black African origin of Homo Sapiens and his phylogenetic history. What's more, why did Homo Sapiens suddenly become cognitive? What about the connection cognition-mind-language? His Homo Sapiens is totally mute. Cognition occurred among Homo Sapiens in the whole world at the same time. How did it spread from Western Europe to the whole world? But how could that happen in 70,000 BCE with no mass concentration and fast traveling? All that makes this cognitive revolution absolutely improbable. Homo Sapiens was cognitive long before. He developed articulated language from pre-human inherited practices that were not articulated languages. He developed the use of ochre (from body decoration to burial rituals). He developed pierced shells strung on some "rope" though we do not know the value of these strings of shells. He invented new stone processing techniques for tools and weapons. He invented new hunting procedures and fishing. He gathered and processed natural edible items. If we listen to Harari Homo Sapiens, before 70,000 years ago, was mute (language is never taken into proper account) and hardly more developed than big apes.

In the second book, Homo Sapiens becomes Homo Deus, God himself, and Homo Sapiens is terminated and replaced by a human-mechanical hybrid, a vision similar to Ray Kurzweil's. Harari's vision is a dystopia based on some very debatable approach to ancient history. Some unidentified godlike spirit or divine genetic mutation caused the sudden cognitive revolution of Homo Sapiens from a simple mammal to the brilliant human inventor we know. Then this divine genetic mutation endowed man with the divine inventiveness that will bring humanity down.
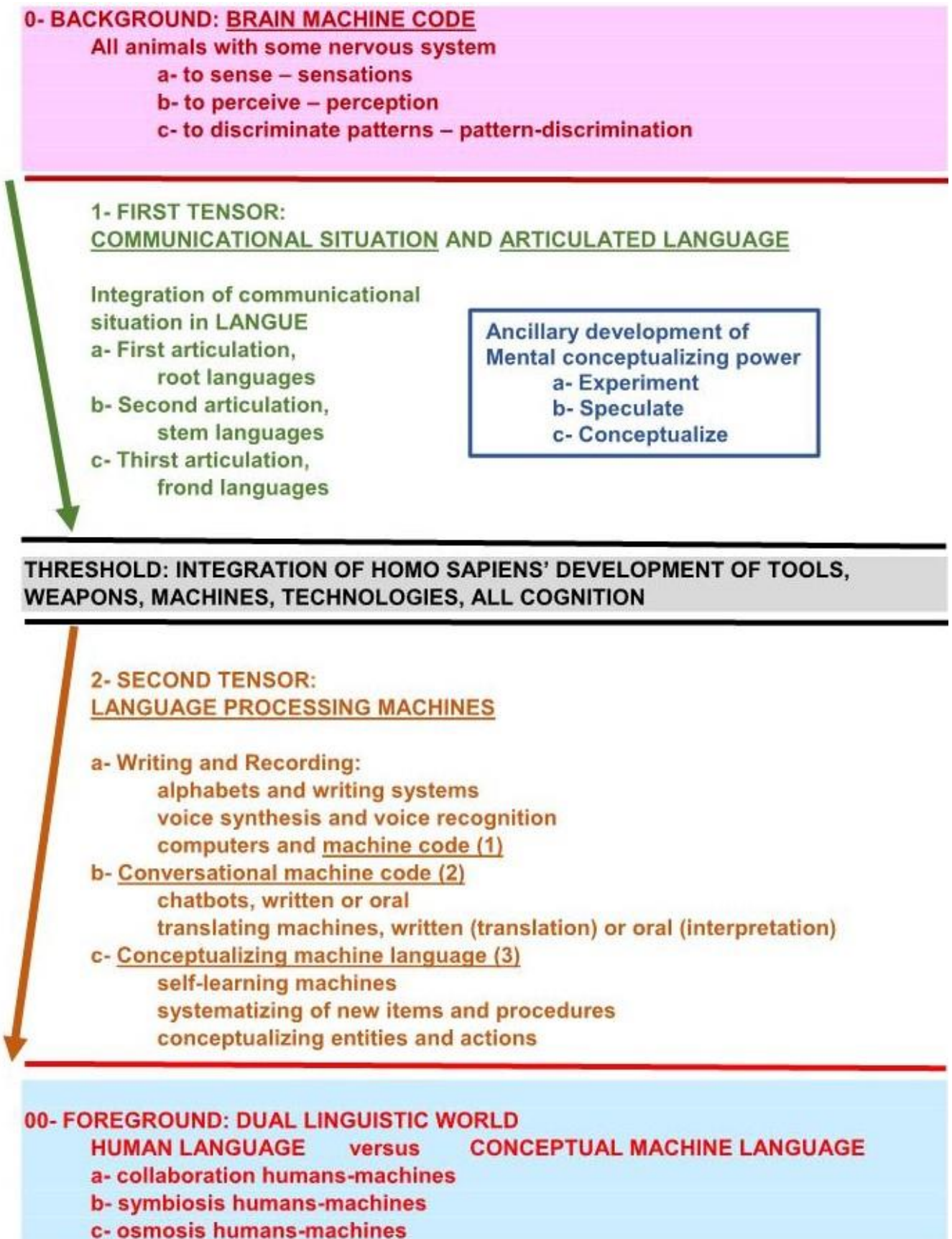
These authors are rewriting the Old Testament, in a purely technical way, Kurzweil, and in a miraculous apocalypse, Harari. Even if both said it is nothing but a metaphor, the reference to God would remain. Words have phatic and performative power as soon as they are uttered. Let's find refuge in Buddhism that states man is in no way of any divine nature, is purely human and uses his mind to solve all problems he encounters, and robots are just one more problem and nothing else.

Man has systematically developed physically and mentally along with the knowledge he constructed and the machines or technologies he built to satisfy his needs and his desires. Nothing would have happened if humanity had not developed their communicational power with articulated language.

Will humanity live in peaceful collaboration, symbiosis or osmosis with AI machines and be able to communicate with them in some oral and written language that could be broadcast everywhere? This may imply the linguistic unification of humanity, at least a unification in diversity.

I will close this presentation with a figure (Figure 3) that reconstructs the radical ternary tensor of the beginning in vertical depth with the original situation at the top and the problematic present-future at the bottom and between these two the three stages of Tensor 1 with the invention of human articulated language, the Threshold of human practical utilitarian technological-scientific (religious-philosophical-artistic) development producing machines processing language, and Tensor 2 and the phylogeny of language processing machines from purely practical mechanical processing to machine code, then conversational machine code, and finally AI language.

0- BACKGROUND: BRAIN MACHINE CODE
    All animals with some nervous system
        a- to sense – sensations
        b- to perceive – perception
        c- to discriminate patterns – pattern-discrimination

1- FIRST TENSOR:
COMMUNICATIONAL SITUATION AND ARTICULATED LANGUAGE

Integration of communicational
situation in LANGUE
a- First articulation,
        root languages
b- Second articulation,
        stem languages
c- Thirst articulation,
        frond languages

Ancillary development of
Mental conceptualizing power
        a- Experiment
        b- Speculate
        c- Conceptualize

THRESHOLD: INTEGRATION OF HOMO SAPIENS' DEVELOPMENT OF TOOLS, WEAPONS, MACHINES, TECHNOLOGIES, ALL COGNITION

2- SECOND TENSOR:
LANGUAGE PROCESSING MACHINES

a- Writing and Recording:
        alphabets and writing systems
        voice synthesis and voice recognition
        computers and machine code (1)
b- Conversational machine code (2)
        chatbots, written or oral
        translating machines, written (translation) or oral (interpretation)
c- Conceptualizing machine language (3)
        self-learning machines
        systematizing of new items and procedures
        conceptualizing entities and actions

00- FOREGROUND: DUAL LINGUISTIC WORLD
    HUMAN LANGUAGE   versus   CONCEPTUAL MACHINE LANGUAGE
    a- collaboration humans-machines
    b- symbiosis humans-machines
    c- osmosis humans-machines

Figure 13: From Brain Machine Code to Conceptual Machine Language

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